

WHAT IS CLAIMED IS:

1. A flow amount measuring apparatus comprising:
 - a fluid temperature detector for detecting a fluid temperature;
 - a heater controllable to a reference temperature which is either one of a fixed temperature and a variable temperature responsive to the fluid temperature detected by the fluid temperature detector;
 - a flow amount detector disposed at either one of an upstream side and a downstream side of the heater with respect to a direction of fluid flow and changes its temperature in response to the fluid flow amount and the fluid flow direction; and
 - detecting means for detecting the fluid flow amount variable with the fluid flow direction from the temperature detected by the fluid amount detector.
2. A fluid amount measuring apparatus of claim 1, wherein:
 - the detecting means is for producing an output corresponding to a difference between the temperature detected by the fluid amount detector and a fixed temperature.
3. A flow amount measuring apparatus of claim 1, wherein:
 - the detecting means is for producing an output corresponding to a difference between the temperature detected by the fluid amount detector and the temperature detected by the fluid temperature detector.

4. A flow amount measuring apparatus of claim 1, wherein:
the flow amount detector is disposed upstream the heater with respect to a forward direction of a fluid flow;

the detecting means is for producing an output varying in dependence on the fluid flow in the forward direction and in a reverse direction when the temperature detected by the flow amount detector is lower and higher than a predetermined temperature, respectively, and varying in dependence on a temperature difference between the predetermined temperature and the temperature detected by the flow amount detector.

5. A flow amount measuring apparatus of claim 1, wherein:
the flow amount detector is disposed downstream the heater with respect to the forward direction of a fluid flow;

the detecting means is for producing an output varying in dependence on the fluid flow in a reverse direction and in the forward direction when the temperature detected by the flow amount detector is lower and higher than a predetermined temperature, respectively, and varying in dependence on a temperature difference between the predetermined temperature and the temperature detected by the flow amount detector.

6. A flow amount measuring apparatus of claim 1, wherein:
a temperature of the heater at one of an upstream side and a downstream side and another of the upstream side and the downstream side is lower and higher than the reference temperature, respectively.

7. A flow amount measuring apparatus of claim 1, wherein:

the flow amount detector is disposed to be capable of detecting a temperature which is lower and higher than the reference temperature when the fluid flow is in a direction from the flow amount detector to the heater and in a direction from the heater to the flow amount detector, respectively.

8. A flow amount measuring apparatus of claim 1, wherein:

the heater includes a strip which turns at a plurality of points to have a total width larger than that of the fluid temperature detector and the fluid amount detector in the fluid flow direction.

9. A flow amount measuring apparatus of claim 1, further comprising:

a substrate on which the fluid temperature detector, the fluid amount detector and the heater are formed, the substrate having a cavity underneath the fluid temperature detector.

10. A flow amount measuring apparatus of claim 1, further comprising:

a substrate on which the fluid temperature detector, the fluid amount detector and the heater are formed, the substrate having slits at the upstream side of the flow amount detector and the downstream side of the heater.

11. A flow amount measuring apparatus comprising:

a substrate;

a heater formed on the substrate and controllable to a first reference temperature;

a first temperature detector formed on the substrate at a position upstream of the heater;

a second temperature detector formed on the substrate at a position close to the heater; and

a control circuit connected to the heater, the first temperature detector and the second temperature detector and including a heater control part and a flow amount measuring part, the first temperature detector being for detecting a first temperature and connected to at least one of the heater control part and the flow amount measuring part, the second temperature detector being connected to the flow amount measuring part, and the flow amount measuring part producing an output varying with a difference between a second temperature detected by the second temperature detector and a second reference temperature and with a flow direction of fluid passing along the substrate.

12. A flow amount measuring apparatus of claim 11, wherein:

the first temperature detector is connected to the heater control part so that the first reference temperature of the heater is controlled to vary with the first temperature detected by the first temperature sensor; and

the second reference temperature is fixed.

13. A flow amount measuring apparatus of claim 11, wherein:
the first temperature detector is connected to the second
temperature detector so that the second temperature detected by
the second temperature detector is corrected by the first
temperature detected by the first temperature detector.

14. A flow amount measuring apparatus of claim 11, wherein:
the heater has a width in a direction of fluid flow which
is larger than that of the second temperature detector.

15. A flow amount measuring apparatus of claim 11, wherein:
the substrate has cavities at locations underneath the
first temperature detector, the heater and the second temperature
detector.

16. A flow amount measuring apparatus of claim 11, wherein:
the substrate has a slit formed between the second
temperature detector and the heater.

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